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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
09/425,694	10/22/99	BRUNNER	AS
			EXAMINER
			BROWN, C
ART UNIT		PAPER NUMBER	
1765		5	

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IM62/0329

DATE MAILED: 03/29/00

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

# Office Action Summary

Application No.  
**09/425,694**

Applicant(s)  
**Brunner et al.**

Examiner  
**Charlotte Brown**

Group Art Unit  
**1765**



☒ Responsive to communication(s) filed on Oct 22, 1999

☐ This action is **FINAL**.

☐ Since this application is in condition for allowance except for formal matters, **prosecution as to the merits is closed** in accordance with the practice under *Ex parte Quayle*, 35 C.D. 11; 453 O.G. 213.

A shortened statutory period for response to this action is set to expire 3 month(s), or thirty days, whichever is longer, from the mailing date of this communication. Failure to respond within the period for response will cause the application to become abandoned. (35 U.S.C. § 133). Extensions of time may be obtained under the provisions of 37 CFR 1.136(a).

## Disposition of Claim

☒ Claim(s) 1-10 is/are pending in the application

Of the above, claim(s) \_\_\_\_\_ is/are withdrawn from consideration

☐ Claim(s) \_\_\_\_\_ is/are allowed.

☒ Claim(s) 1-10 is/are rejected.

☐ Claim(s) \_\_\_\_\_ is/are objected to.

☐ Claims \_\_\_\_\_ are subject to restriction or election requirement.

## Application Papers

☐ See the attached Notice of Draftsperson's Patent Drawing Review, PTO-948.

☐ The drawing(s) filed on \_\_\_\_\_ is/are objected to by the Examiner.

☐ The proposed drawing correction, filed on \_\_\_\_\_ is ☐ approved ☐ disapproved.

☐ The specification is objected to by the Examiner.

☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. § 119

☒ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).

☒ All ☐ Some\* ☐ None of the CERTIFIED copies of the priority documents have been

☒ received.

☐ received in Application No. (Series Code/Serial Number) \_\_\_\_\_

☐ received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

\*Certified copies not received: \_\_\_\_\_

☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

## Attachment(s)

☒ Notice of References Cited, PTO-892

☒ Information Disclosure Statement(s), PTO-1449, Paper No(s). 3 and 4

☐ Interview Summary, PTO-413

☐ Notice of Draftsperson's Patent Drawing Review, PTO-948

☐ Notice of Informal Patent Application, PTO-152

— SEE OFFICE ACTION ON THE FOLLOWING PAGES —

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### DETAILED ACTION

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claim 2 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In line 3 of claim 2, "SC1" is vague and indefinite.

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pirooz et al. (EP 0701275).

From line 32 of column 2 to the end of column 3, Pirooz discloses a method for treating a silicon wafer which includes the step of contacting the surface of the silicon wafer with an aqueous solution containing hydrofluoric acid to remove the metals from the wafer surface. The removal is carried out by contacting the silicon wafers with an aqueous solution containing about 1:1 to 1:10,000 parts by volume HF:H<sub>2</sub>O. To enhance the metals removal, the solution may

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additionally contain HCl,  $H_2O_2$  OR  $O_3$ . The aqueous ozone solution,  $O_3$ , has a concentration from 0.1 ppm to 50 ppm. This treatment sequence is preceded by a SC-1 (standard clean 1) in which the semiconductor wafers are treated with a solution containing  $H_2O$ ,  $H_2O_2$ , and  $NH_4OH$ . The solution may be at a temperature of about  $10^{\circ}C$  to about  $90^{\circ}C$  and the silicon wafers are immersed in a flowing bath of this solution for a period of at least about 0.1 minutes. The final step of the cleaning process is drying the oxidized wafers. The wafers may be dried using any method which does not recontaminate the wafers with metals or other contaminants. Such methods include conventional spin drying and isopropyl alcohol vapor drying techniques which are well known in the field.

Unlike the claimed invention, Pirooz does not disclose a method for forming the treatment sequence B<sub>2</sub> by treating the semiconductor wafer with an aqueous  $O_3$  solution and then treating the semiconductor wafers with a liquid selected from the group consisting of water and an aqueous HCl solution. Because Pirooz first treats the semiconductor wafer with an HF solution and then adds  $O_3$ ,  $H_2O_2$ , or HCL, in water, it is the Examiner's position that a person having ordinary skill in the art would have found it obvious to modify Pirooz's procedure by treating the semiconductor wafers with  $O_3$ , and then treating the wafers with a liquid containing  $H_2O$  and HCL. This sequence of steps would have been anticipated to produce an expected result.

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5. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. (EP 0731498A2)

Fukuzawa discloses a silicon substrate surface processing method comprising the steps of supplying an HF water solution and ozone water into a processing bath to create a mixture containing HF with a concentration of 0.01% to 1% and ozone water with a concentration of 0.1 ppm to 20 ppm.

6. Any inquiry concerning this communication from the Examiner should be directed to Charlotte A. Brown whose telephone number is (703) 305-0727.

CAB

March 24, 2000

  
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